

WB
510
U59t
1944

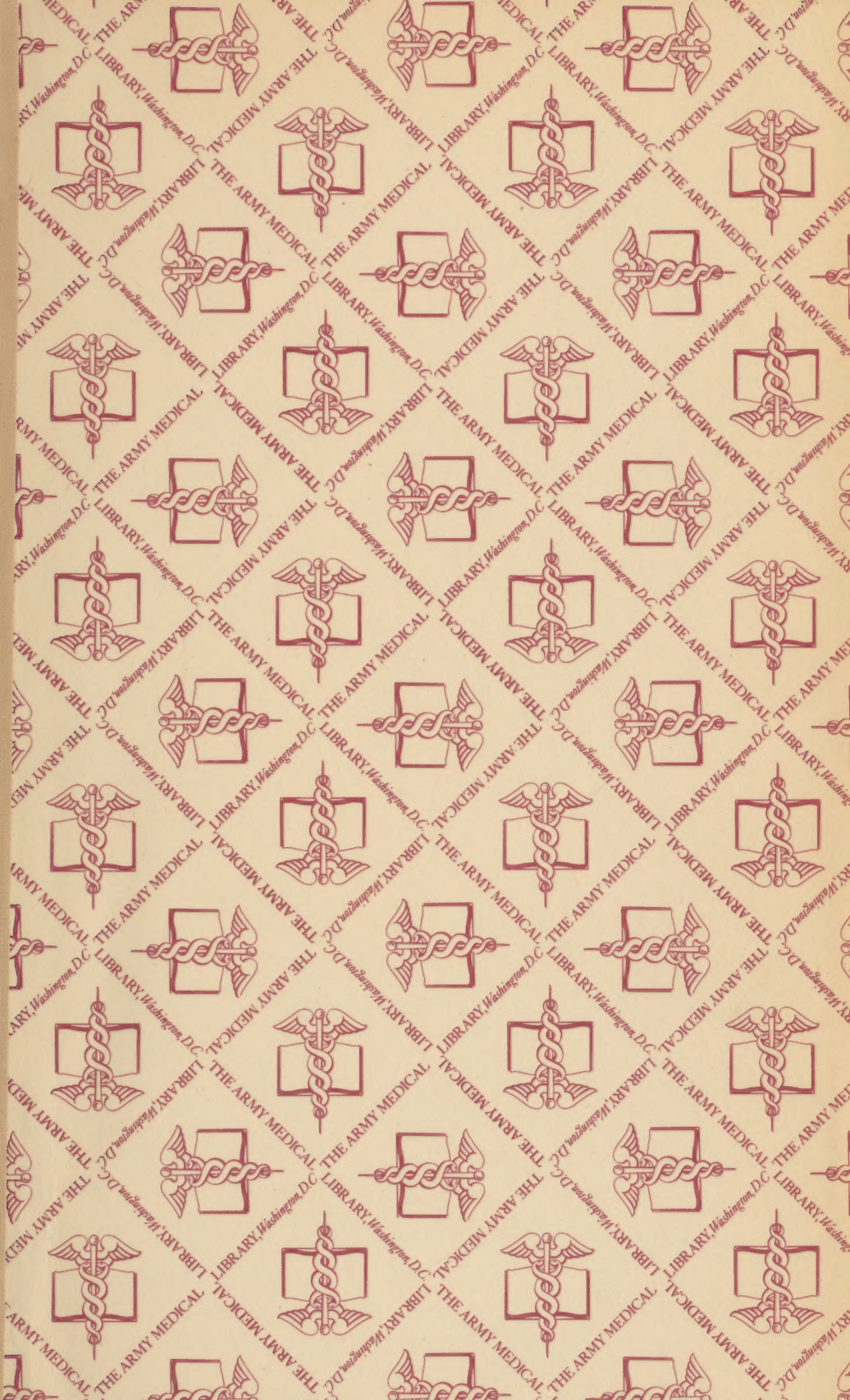
U. S. WAR DEPT. TECHNICAL MANUAL 8-350

TECHNIQUE OF MEDICAL DIATHERMY

NATIONAL LIBRARY OF MEDICINE



NLM 00088952 3



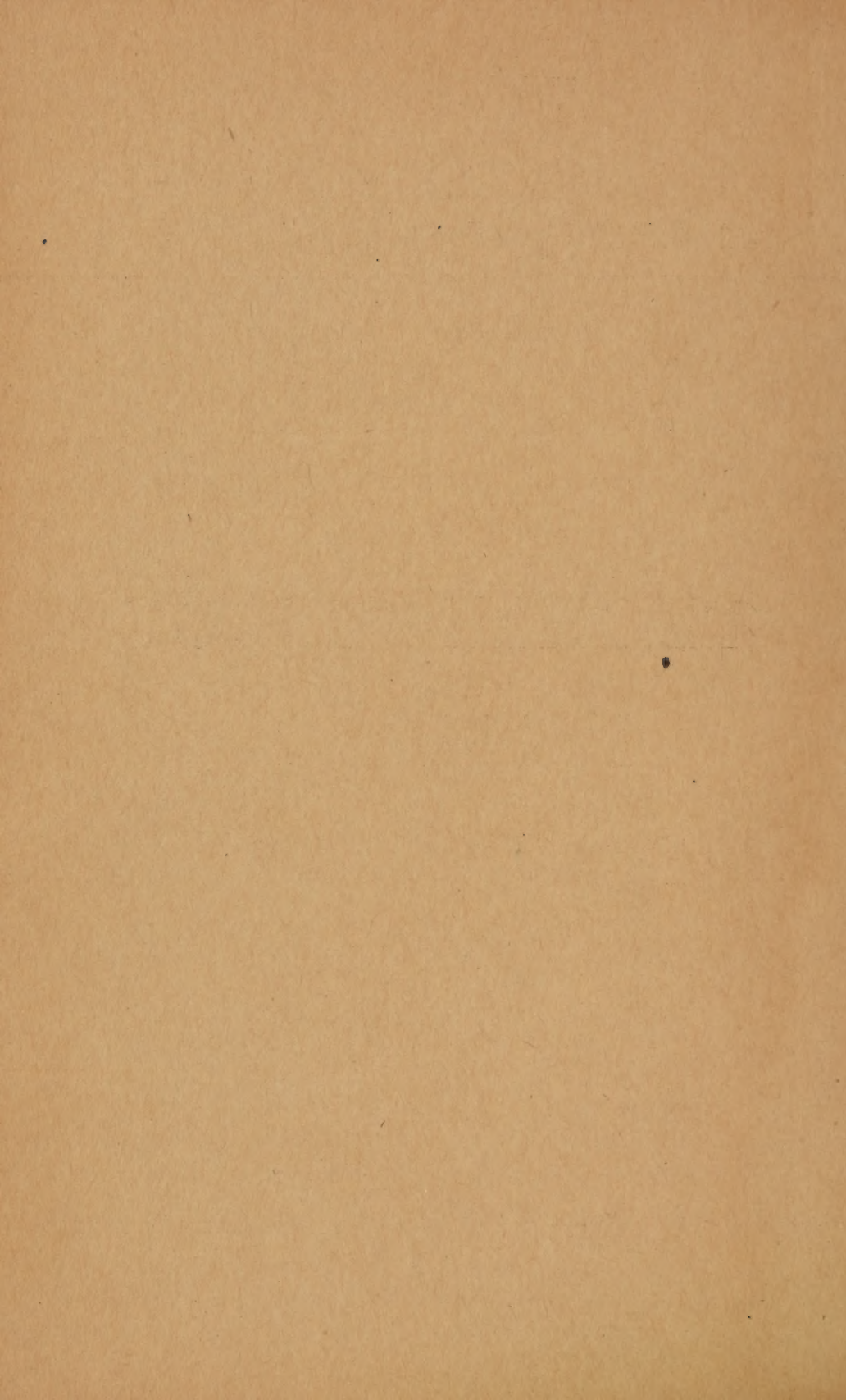
TM 8-350

WAR DEPARTMENT TECHNICAL MANUAL

TECHNIQUE OF MEDICAL DIATHERMY



WAR DEPARTMENT • 15 NOVEMBER 1944



TECHNIQUE OF
MEDICAL
DIATHERMY



WAR DEPARTMENT • 15 NOVEMBER 1944

For sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

United States Government Printing Office

Washington : 1944

WAR DEPARTMENT,
WASHINGTON 25, D. C., 15 NOVEMBER 1944.

TM 8-350, Technique of Medical Diathermy, is published for the information and guidance of all concerned.

[A.G. 300.7 (12 Jul 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
*Major General,
The Adjutant General.*

DISTRIBUTION:

Named Gen Hosp (12); Sta Hosp, Z. I. (6); Numbered Gen Hosp, T/O 8-550 (12); Numbered Sta Hosp, T/O 8-560 (6).

For explanation of symbols, see FM 21-6.

WB
510
459±
1944
c.1



CONTENTS

| | <i>Paragraphs</i> | <i>Page</i> |
|--|-------------------|-------------|
| SECTION I. GENERAL | 1 | 1 |
| II. PRINCIPLES IN THE USE OF HEAT..... | 2-5 | 2 |
| III. DIATHERMY SERVICE | 6-9 | 3 |
| IV. PRACTICAL APPLICATION..... | Fig. 6①-32② | 10 |

SECTION I

GENERAL

1. PURPOSE AND SCOPE. The purpose of this manual is to provide a handy text illustrating the more frequent uses of medical diathermy as applied by coil and disc technique. Pathological indications relating to medical diathermy are not presented in this manual. For such information the reader is referred to standard texts on physical therapy.

SECTION II

PRINCIPLES IN THE USE OF HEAT

2. GENERAL. Heat, administered by various methods, is accepted as a valuable therapeutic agent in many conditions. Medical diathermy applies heat usually by means of the coil or disc technique. Generally mild heat, or heat of moderate intensity over a longer period is as effective and is better tolerated than intense heat for shorter periods.

3. PHYSIOLOGIC EFFECTS. a. Heat will accomplish two physiological effects:

(1) An increase in blood supply to the part.

(2) Relaxation of muscle spasm, which will frequently relieve pain.

b. Caution. Heat should never be used where an increase in blood would be detrimental as in acute trauma during the first 48 hours when there may be a chance of further local hemorrhage, or where there is bleeding into the tissues. Diathermy can generally be safely started after 48 hours in traumatic cases, thus hastening resolution of hemorrhage and giving an earlier and more complete recovery with less fibrous organization of the exudate. It should not be used in any case where there is organic or functional inability on the part of the circulation to increase in response to heat. Great caution should also be exercised in treating anesthetic regions, or injuries which may be complicated by vascular or neurovascular changes. The occurrence of increased pain, or the appearance of pain in non-painful areas is to be regarded as an absolute indication for the immediate reduction in intensity of the application. If pain persists after the reduction of intensity it is well to consider the discontinuance of treatment with diathermy.

4. SPHERE OF APPLICATION. Medical diathermy may be used with benefit wherever there is deep seated inflammation or tissue repair in progress so long as caution, particularly those noted in paragraph 3b, is exercised. It is well to bear in mind that inflamed tissues, due to the presence of edema, are more readily overheated than normal tissues. It is essential, therefore, that only moderate heat be induced in inflamed tissues. A practical way of accomplishing this is to start the treatment with an intensity sufficiently great that the patient states that he feels considerable heat, then IMMEDIATELY turn down the intensity to two-thirds or even to one-half the original setting.

5. FREQUENCY AND LENGTH OF TREATMENT. The frequency and the length of the treatments must be determined in each case with due regard to the pathologic process involved. It may be stated in general that where there is acute inflammation the treatments should be mild and frequently repeated, whereas, in the treatment of simple muscle sprains they may be of greater intensity and at less frequent intervals.

SECTION III

DIATHERMY SERVICE

6. GENERAL. a. Modern diathermy machines have treatment cables (coil) and treatment drums (disc) which make use of the principle of inducing heat in tissue due to the presence of an electromagnetic field. It may be stated that in the average machine a current of about 7000 to 8000 volts changing direction of flow at the rate of 12 to 24 million times a second is generated. It is this current running through the treatment coil or disc which sets up the electromagnetic field (figs. 1, 2, 3, 4, and 5).

b. **Electromagnetic field.** Eddy currents, set up in the tissue by the presence of the electromagnetic field, heat the tissues in direct proportions to the conductivity of the tissues, providing there is adequate spacing of the coil or disc from the skin.

7. FUNDAMENTALS OF DIATHERMY APPLICATION. a. **General.** It is not the purpose of this manual to set forth the specific technique of setting the intensity controls for any given piece of apparatus. Specific instructions on the operation of the machine are furnished by the manufacturer. However, when moderate heat is called for, this is approximately one-half the maximum intensity. Mild heat is approximately one-third the maximum intensity setting.

b. Metallic objects will heat up quickly in the electromagnetic field, therefore, metal bracelets or wrist watches should be removed. Fillings in the teeth and other buried metals may not cause difficulties, if low intensity treatments or "indirect exposures" are administered in such cases. However, in the presence of metal bone-plates, this practice is not approved because of possible tissue damage which may result.



FIGURE 1. COIL, 3 SPACERS, RUBBER CUFF.



- a.* Rubber insulation.
- b.* Woven copper conductor.
- c.* Sash-cord center.

FIGURE 2. CROSS-SECTION OF COIL
SHOWING FROM WITHOUT IN.

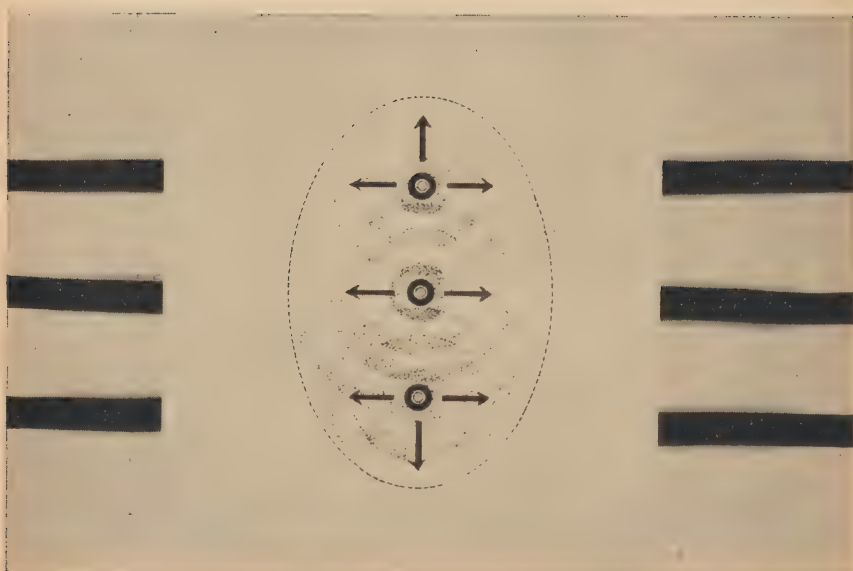


FIGURE 3. SCHEMATIC REPRESENTATION OF ELECTRO-
MAGNETIC FIELD IN VICINITY OF COIL (3 turns).
(Heavy black circles represent coil).



FIGURE 4. TREATMENT DISC (DRUM).



FIGURE 5. TREATMENT DISC (DRUM) WITH COVER REMOVED TO SHOW INTERIOR CONSTRUCTION.

c. Adequate spacing from the skin is necessary to avoid too great a degree of skin heating. To obtain the desired spacing it is advisable to use air-spaced applicators (disc type) when possible so that spacing by towels or other absorbent materials may be unnecessary; evaporation of perspiration occurring in the open atmosphere. When using the coil it is necessary to utilize some absorbent material such as heavy dry towels to obtain the desired spacing.

8. METHODS OF DIATHERMY APPLICATION. The following pages present an approved technique of diathermy application by means of coil and disc. For the sake of clarity it has often been necessary to show one or more preparatory stages for the treatment. It should be remembered that the last illustration in each case presents the final technique with all insulation in place.

9. CAUTIONS. a. When using the coil it is necessary to make certain that the various turns of the coil do not come in contact with each other. For this purpose the manufacturers provide wooden or composition spacers to be placed between the turns to keep them at an even distance. The final turn of the coil, which leads to the machine, is spaced from the rest of the coil by a rubber cuff or by one or more felt spacers.

b. In the application of diathermy to the head for whatever reason, it is advisable to insure adequate nasal drainage to avoid serious or annoying symptoms. The use of a vasoconstrictor, such as benzedrine inhalor, or a 5 percent solution of some standard vasoconstrictor, and the prone position with the head over the edge of a table for a period of five minutes is recommended.

SECTION IV

PRACTICAL APPLICATION

HEAD AND PARANASAL SINUSES



①

FIGURE 6. RELATION OF DISC TO PART.

Caution. Remove metallic objects (hair-pins, metal clasps, glasses and metal neck chains). Insure adequate nasal drainage.

HEAD AND PARANASAL SINUSES



(2)

FIGURE 6. RELATION OF DISC TO PART—
LATERAL VIEW—continued.

Insulation: None.

Intensity: Mild.

Danger: Dizziness or headache, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Sitting when possible.

HEAD AND PARANASAL SINUSES



①

FIGURE 7. RELATION OF COIL TO PART.

Caution. Remove metallic objects (hair-pins, metal clasps, glasses and metal neck chains). Insure adequate nasal drainage.

HEAD AND PARANASAL SINUSES



(2)

FIGURE 7. RELATION OF COIL TO PART—continued.

Insulation: One pillow or six thicknesses dry toweling.

Intensity: Mild.

Danger: Dizziness or pain, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Sitting, or side lying.

HEAD AND PARANASAL SINUSES



FIGURE 8. RELATION OF DISC TO PART.

Caution. Remove metallic objects (hair-pins, metal clasps, glasses and metal neck chains). Insure adequate nasal drainage.

Insulation: None.

Intensity: None.

Danger: Dizziness or pain, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Sitting if possible.

NECK—POSTERIOR



FIGURE 9. RELATION OF DISC TO PART.

Caution. Remove metallic objects (hair-pins, metal clasps, glasses, metal neck chains).

Insulation: None.

Intensity: Moderate to mild.

Danger: Dizziness or pain, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Sitting if possible.

NECK—POSTERIOR



①

FIGURE 10. RELATION OF COIL TO PART.

Caution. Remove metallic objects (hair-pins, metal clasps, glasses, metal neck chains). Folded heavy towels in each axilla, or arms well separated from body.

NECK—POSTERIOR



②

FIGURE 10. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate to mild.

Danger: Dizziness or pain, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Prone. Support head.

NECK



①

FIGURE 11. RELATION OF COIL TO PART.

Caution. Remove metallic objects (hair-pins, metal clasps, glasses, metal neck chains). Folded heavy towels in each axilla, or arms well separated from body.

NECK



②

FIGURE 11. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of dry heavy toweling.

Intensity: Moderate to mild.

Danger: Dizziness or pain, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Sitting if possible, or supine.

SHOULDER AREA—ANTERIOR



①

FIGURE 12. RELATION OF COIL TO PART.

Caution. Remove metal neck chains. Folded heavy towels in each axilla, or arms well separated from body.

SHOULDER AREA—ANTERIOR



②

FIGURE 12. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate to mild.

Danger: Pain or deep muscle aching, reduce intensity,
or stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine.

SHOULDER AREA—ANTERIOR



FIGURE 13. RELATION OF DISC TO PART.

Caution. Remove metal neck chain. Folded heavy towel in each axilla, or arms well separated from body.

Insulation: None.

Intensity: Moderate to mild.

Danger: Pain or deep muscle aching, reduce intensity, or stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine, or sitting.

CHEST—ANTERIOR



FIGURE 14. RELATION OF DISC TO PART.

Caution. Remove metal neck chain. Folded heavy towel in each axilla, or arms well separated from body.

Insulation: None.

Intensity: Moderate.

Danger: Palpitation or dyspnea, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine.

CHEST—ANTERIOR



①

FIGURE 15. RELATION OF COIL TO PART.

Caution. Remove metal neck chain. Folded heavy towel in each axilla, or arms well separated from body.

CHEST—ANTERIOR



②

FIGURE 15. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: Palpitation or dyspnea, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine.

SHOULDER AREA—POSTERIOR



①

FIGURE 16. RELATION OF COIL TO PART.

Caution. Remove metal neck chain or hair-pins and metal clasps. Folded heavy towel in each axilla, or arms well separated from body.

SHOULDER AREA—POSTERIOR



②

FIGURE 16. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

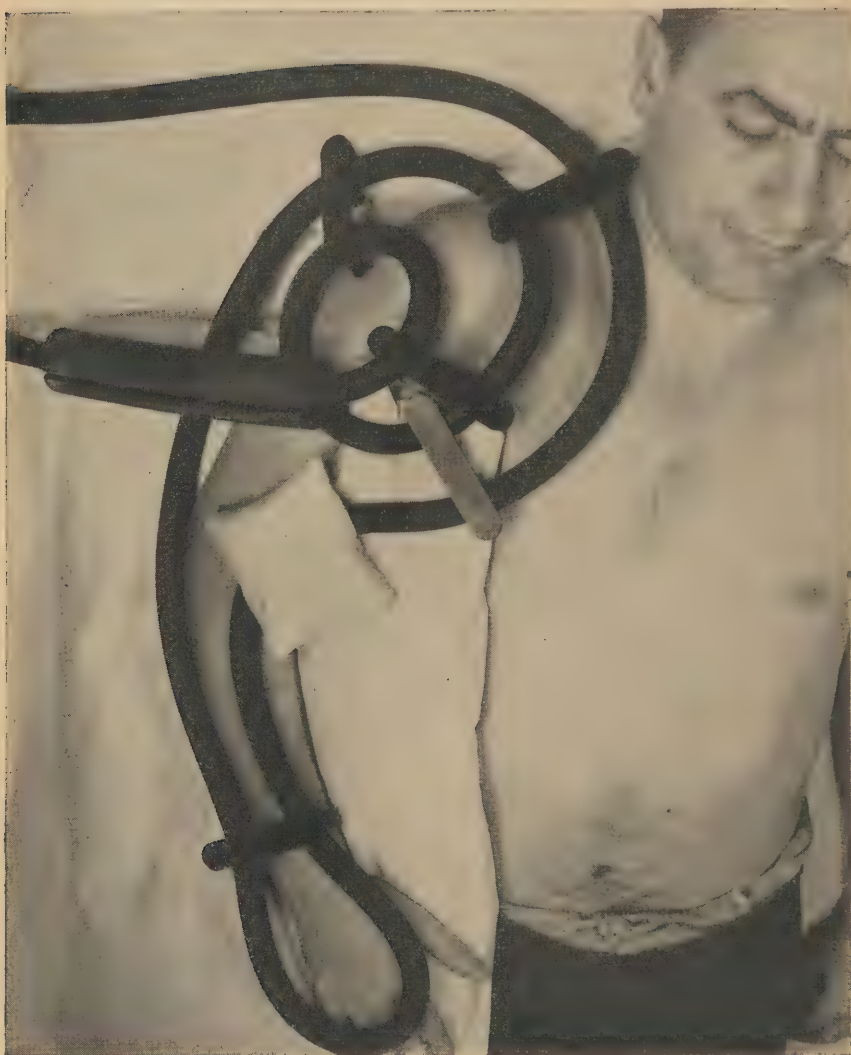
Intensity: Moderate to mild.

Danger: Pain or deep muscle aching, reduce intensity,
or stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Prone with pillow under chest.

ARM AND SHOULDER AREA



①

FIGURE 17. RELATION OF COIL TO PART.

Caution. Remove metal neck chain. Folded heavy towel in each axilla, or arms well separated from body. Arm elevated on one or more pillows.

ARM AND SHOULDER AREA



②

FIGURE 17. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate to mild.

Danger: Pain or deep muscle aching, reduce intensity, or stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine with arm elevated on one or more pillows.

CHEST—POSTERIOR



①

FIGURE 18. RELATION OF COIL TO PART.

Caution. Remove metal neck chain. Folded heavy towel in each axilla, or arms well separated from body.



②

FIGURE 18. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: Palpitation or dyspnea, stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Prone.

CHEST—POSTERIOR



FIGURE 19. RELATION OF DISC TO PART.

Caution. Remove metal neck chain. Folded heavy towel in each axilla, or arms well separated from body. A pillow under chest may add to the comfort of patient.

ABDOMEN—PELVIC AREA



FIGURE 20. RELATION OF DISC TO PART.

Caution. Folded heavy towel in each axilla, or arms well separated from body. Folded heavy towel in crotch or legs well separated. Folded towel over arm where cable crosses it.

Insulation: None.

Intensity: Moderate.

Danger: Pain or cramps, reduce intensity or stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine.

ABDOMEN AND PELVIC AREA



①

FIGURE 21. RELATION OF COIL TO PART.

Caution. Remove metal belt buckle. Folded heavy towel in each axilla, or arms well separated from body. Folded towel over arm where coil crosses it.

ABDOMEN AND PELVIC AREA



②

FIGURE 21. RELATION OF COIL TO PART—continued

Insulation: Six thicknesses of heavy dry toweling.

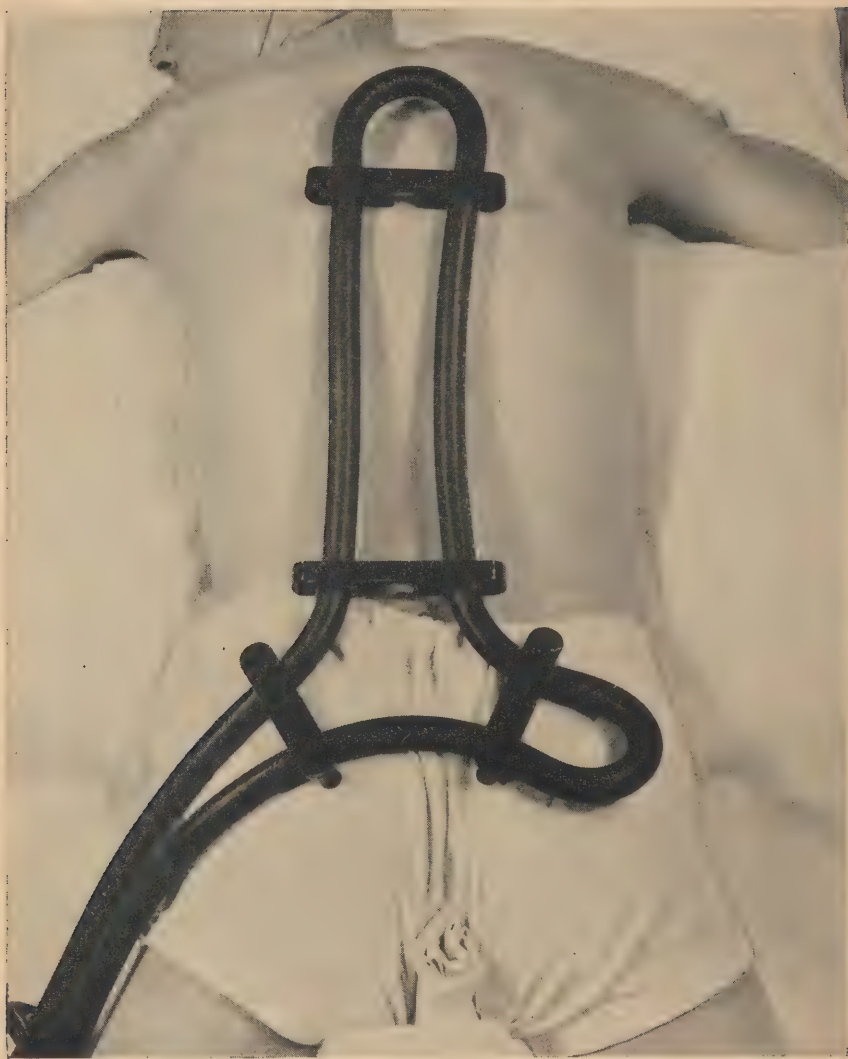
Intensity: Moderate.

Danger: Pain or cramps, reduce intensity or stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine.

SPINE—LUMBOSACRAL AREA



①

FIGURE 22. RELATION OF COIL TO PART.

Caution. Remove metal buckle. Folded heavy towel in each axilla, or arms well separated from body. Folded heavy towel between legs. Pillow beneath chest and pelvis.

SPINE—LUMBOSACRAL AREA



②

FIGURE 22. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: None.

Duration: 45 to 60 minutes.

Patient's position: Prone.

HIP—LUMBOSACRAL AREA—POSTERIOR



①

FIGURE 23. RELATION OF COIL TO PART.

Caution. Remove metal buckle. Folded heavy towel in each axilla, or arms well separated from body. Folded heavy towel between thighs. Hip abdomen area on pillow.

HIP—LUMBOSACRAL AREA—POSTERIOR



②

FIGURE 23. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: None.

Duration: 30 to 60 minutes.

Patient's position: Prone.

BOTH HIPS AND LOWER SPINE AREA



①

FIGURE 24. RELATION OF COIL TO PART.

Caution. Remove metal buckle. Folded heavy towel in each axilla, or arms well separated from body. Folded heavy towel between thighs. Hips and abdomen on pillow.

BOTH HIPS AND LOWER SPINE AREA



②

FIGURE 24. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: None.

Duration: 30 to 60 minutes.

Position: Prone.

HIP AREA—LATERAL POSITION



①

FIGURE 25. RELATION OF COIL TO PART.

Caution. Remove metal buckle. Folded heavy towel in each axilla, or arms well separated from body. Folded heavy towel or pillow between thighs. Hip elevated on pillow.

HIP AREA—LATERAL POSITION



②

FIGURE 25—RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: None.

Duration: 45 to 60 minutes.

Patient's position: Semi-lateral, or lying on side.

HIP—SCIATIC AREA—POSTERIOR



①

FIGURE 26. RELATION OF COIL TO PART.

Caution. Remove metal belt buckle. Folded heavy towel between thighs. Hips on pillow.

HIP—SCIATIC AREA—POSTERIOR



②

FIGURE 26. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: None.

Duration: 30 to 60 minutes.

Patient's position: Prone.

KNEE AREA



①

FIGURE 27. RELATION OF COIL TO PART.

Caution. Remove metal sock holder. Folded heavy towel between thighs, or legs well separated. Knee elevated on pillow.

KNEE AREA



②

FIGURE 27. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

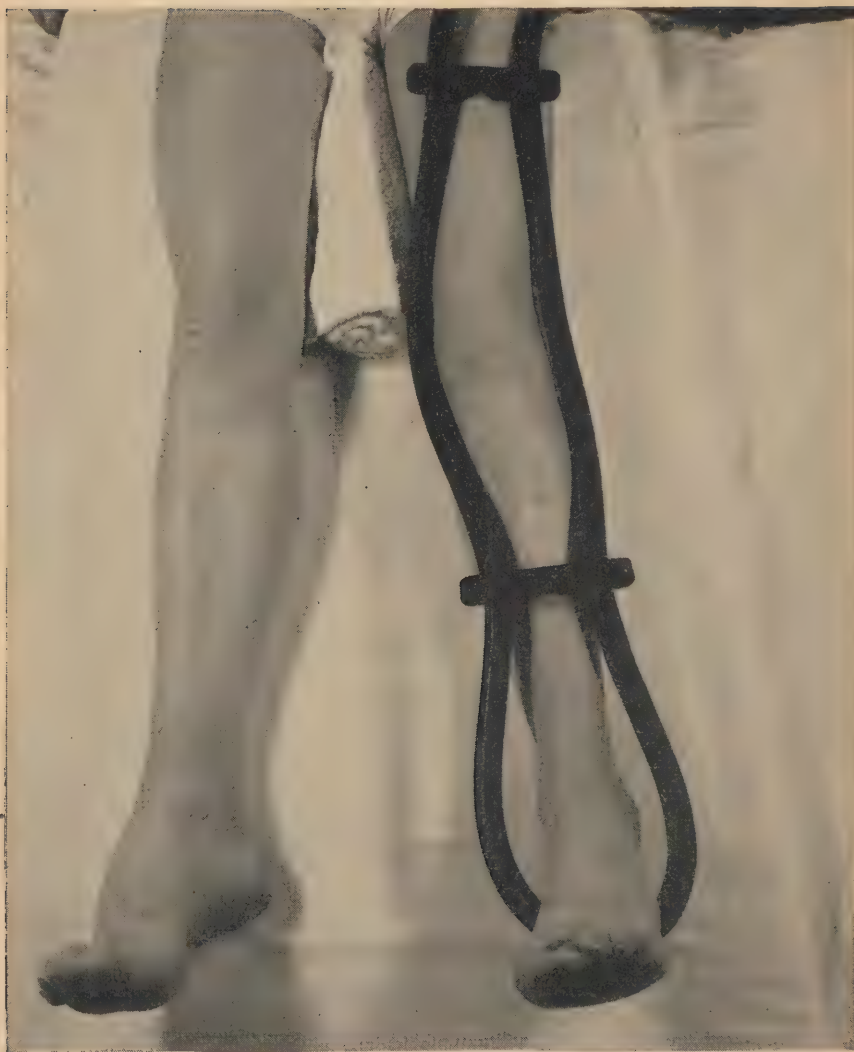
Intensity: Moderate.

Danger: None.

Duration: 30 to 60 minutes.

Patient's position: Supine or sitting.

THIGH—KNEE—FOOT



①

FIGURE 28. RELATION OF COIL TO PART.

Caution. Remove metal sock holder. Folded heavy towel between thighs, or legs well separated. Leg on pillow.

THIGH—KNEE—FOOT



②

FIGURE 28. RELATION OF COIL TO PART—continued.

Insulation: Six thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: None. Pain or deep muscle aching, reduce intensity or stop treatment.

Duration: 30 to 60 minutes.

Patient's position: Supine. Leg on pillow.

PROSTATE—PERINEUM AREA



FIGURE 29. RELATION OF COIL TO CHAIR.

Caution. Twelve thicknesses of heavy dry toweling between chair and coil. Remove any metal connections to chair.

PROSTATE—PERINEUM AREA



FIGURE 30. RELATION OF COIL TO TOWELS AND CHAIR.

Insulation: Six thicknesses of heavy dry toweling over coil. Use more if there is wasting of buttock muscles.

PROSTATE—PERINEUM AREA



FIGURE 31. RELATION OF COIL AND INSULATION TO PART.

Insulation: Six or more thicknesses of heavy dry toweling.

Intensity: Moderate.

Danger: Abdominal cramps or desire to urinate, stop treatment.

Duration: 60 minutes.

Patient's position: Sitting.

VASODILITATION OF LOWER EXTREMITIES



①

FIGURE 32. RELATION OF DISC TO PART FOR REFLEX
VASODILITATION.

Caution. Remove all metal parts. Wrap both lower extremities with single towels. Comforter beneath legs as shown. Folded towel between thighs. Folded towel on arm where cable crosses it.

VASODILITATION OF LOWER EXTREMITIES



②

FIGURE 32. RELATION OF DISC TO PART—continued.

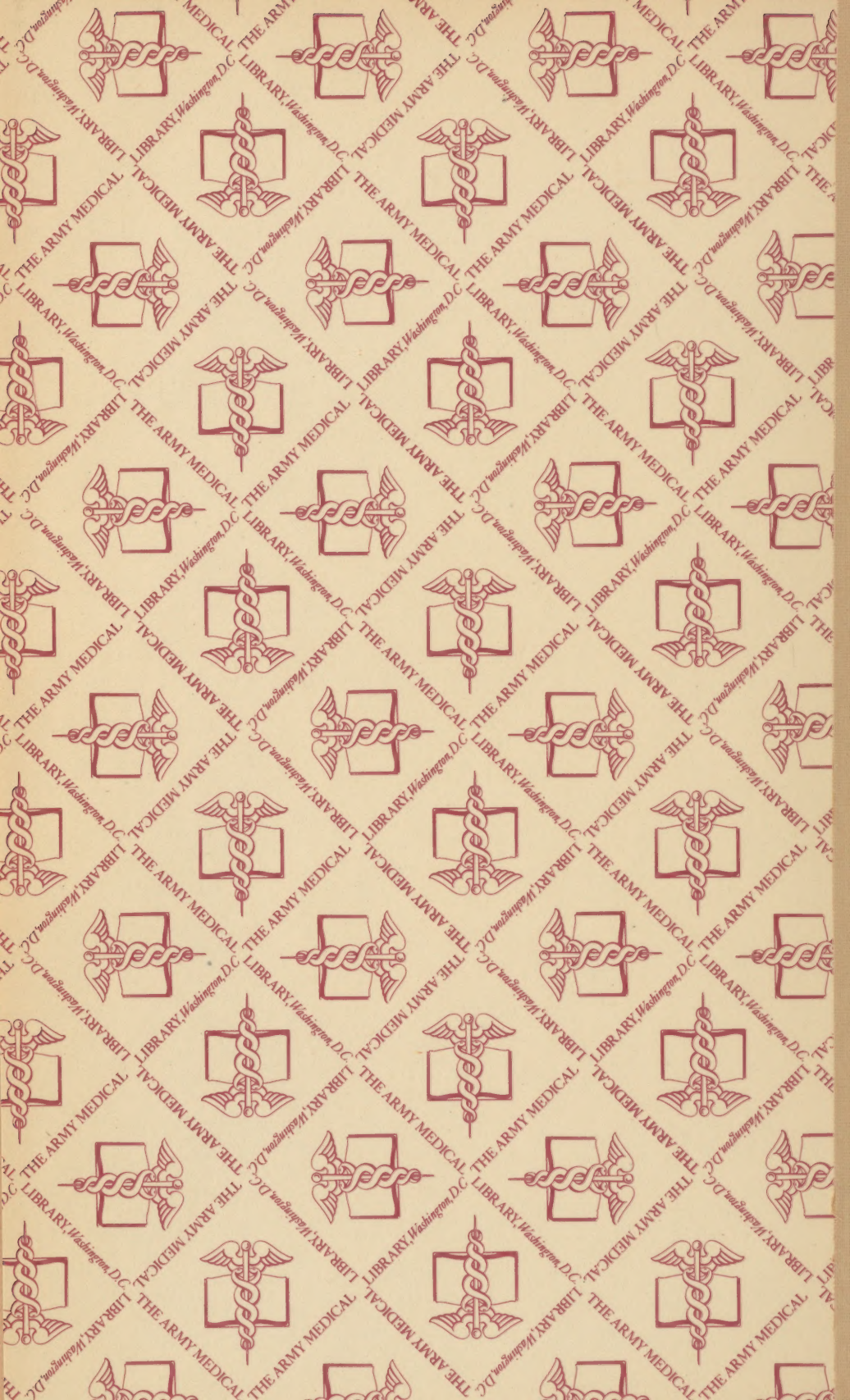
Insulation: None under disc.

Intensity: Moderate.

Danger: Abdominal cramps, reduce intensity or stop treatment.

Duration: 60 minutes.

Patient's position: Supine.



PRESSBOARD
PAMPHLET BINDER

Manufactured by
GAYLORD BROS. Inc.
Syracuse, N. Y.
Stockton, Calif.

NATIONAL LIBRARY OF MEDICINE



NLM 00088952 3